

Cerebrospinal fluid parameters of horses with West Nile virus encephalomyelitis

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Abstract

West Nile virus (WNV) is a mosquito-borne zoonotic arbovirus transmitted in natural cycles between mosquitoes and wild birds. Horses and humans are incidental, dead-end hosts, but can develop severe neurological disorders. By its close contact with the extracellular fluid of the brain, analysis of cerebrospinal fluid (CSF) composition can reflect biological central nervous system (CNS) impairments enabling the diagnosis and understanding of various neurodegenerative CNS disorders.

Fifteen CSF samples were collected from horses with acute neurologic symptoms and positive WNV IgM ELISA on their sera. CSF samples of twenty healthy horses without any neurologic disease were used as controls. Biochemical and cytological parameters were evaluated and compared.

Most of the data obtained from the WNV affected horses did not seem to follow a normal distribution, but protein, creatine-kinase, aspartate-aminotransferase, lactate-dehydrogenase, alkaline-phosphatase, magnesium, glucose, and lactate showed abnormal levels in a number of cases. None of the 6 horses with elevated glucose levels survived (≤ 0.36 , modified Wald method with 90% CI). Opposite to previous equine studies we have found neutrophilic pleocytosis in 54% of cases. Measured data also indicates that CSF neutrophilia is more likely to be found parallel with high protein content (Fisher exact test, two tailed, $p = 0.1026$).

The CSF findings with WNV neuroinvasive disease are nonspecific and variable. Neutrophils are likely play a role in the development of inflammatory response and brain damage. Increased enzyme levels reflect rather CNS injury than blood-brain barrier damage. Elevated glucose levels might be secondary to increased plasma levels and predict outcome.